



Diggin' Dirt

by Ellen R. Braaf

Dirt's gotten a bad rap. How many times have you been warned "Don't get dirty" or been scolded for tracking dirt into the house? No one wants to be called "as dull as dirt" or to be treated "like dirt." Even the word "dirt" has lowly origins. It comes from the Old English word "drit," meaning manure or excrement (poop).

"Drit" means "poop," you know.



I don't like the sound of that.

Lots of animals dig dirt. A pig's tough, flexible snout is as sensitive to touch as a human hand. It makes a great tool for digging up food.

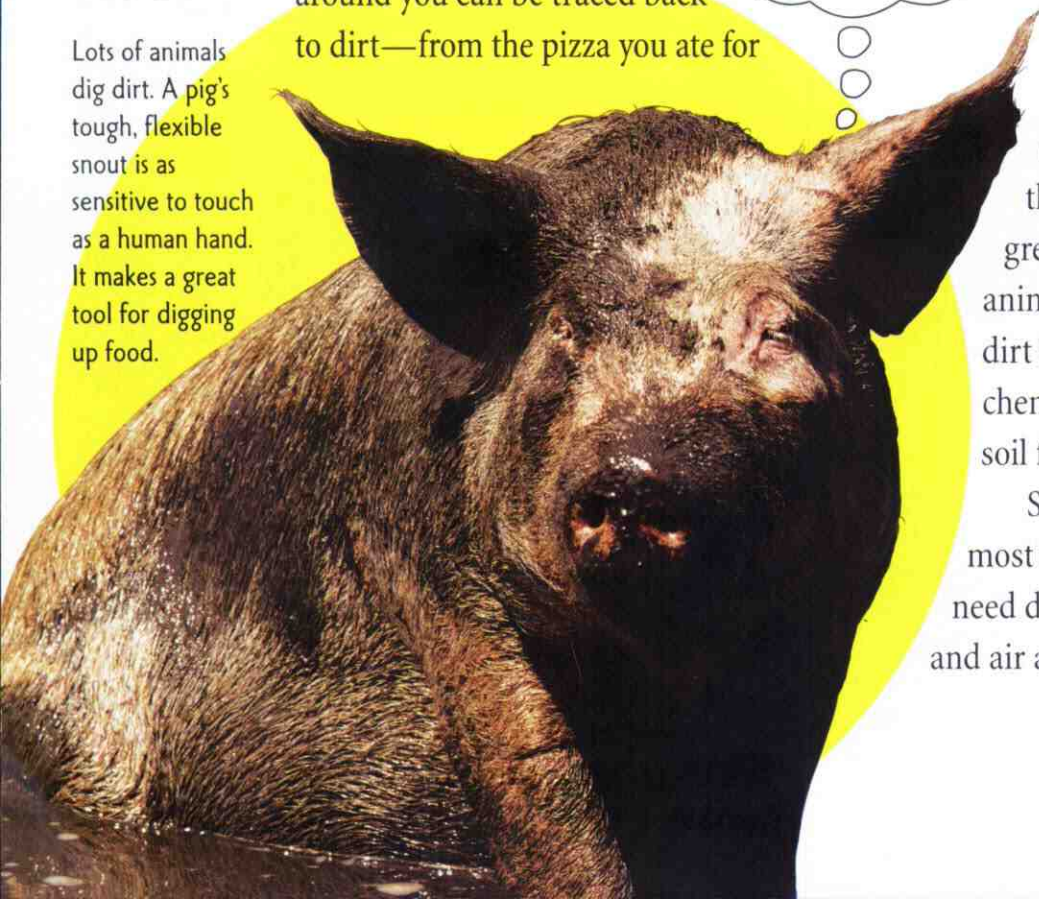
But if you've ever felt oozy mud squishing between your toes or planted seeds in soil and watched them bloom into beautiful flowers, you know that dirt is amazing stuff!

Most of the things you see around you can be traced back to dirt—from the pizza you ate for

I love how it feels!

lunch to the microchips in your computer. Dirt holds the roots of plants and supplies them with nutrients so the plants can grow. (And without green plants, we'd have no food to eat and no oxygen to breathe.) Dirt is the home for countless living organisms. Just a handful contains more living things than all the men, women, and children on the face of the earth. And dirt is nature's great recycler. When plants and animals die, organisms in the dirt feed on them, releasing their chemicals and energy into the soil for use by future generations.

So dirt is really one of the most important things there is! We need dirt as much as we need water and air and sunshine.



It Came from Dirt

You don't have to be rolling in dirt to have it all around you.
What stuff in the picture below got its start in dirt?



art by Brian Biggs

Answer: Well, the chips in your computer are made from silicon, which comes from sand. Your glass is made of sand, too; and the milk in it came from a cow, which ate grass that grew in dirt. So milk kind of comes from dirt. The veggies on your pizza grew in dirt, too. So did the cotton in your blue jeans. So did the trees that were used to make the wood for your desk and your pencil and the paper for your Ask magazine (which is the best use of dirt of all!). Oh, and the tile on your floor could be baked dirt, and the graphite in the pencil is a mineral refined from dirt... enough!



Powerful front arms, two-inch claws, and webbed front toes help badgers dig through dirt—and even asphalt—in search of mice and moles. A person with a shovel can't dig faster.

Dirt is precious. I'm going to store this in a safe place!



highways, schools, and shopping malls.

Far from being “as common as dirt,” soil is

precious. Some types are even so rare as to be listed as endangered.

Endangered Dirt

But there isn't as much dirt around as it might seem. The layer of soil covering the earth is only a few feet deep. It's like the thin skin on an apple—except this skin doesn't cover the whole apple.

It squirts so nicely!

Remember that 75 percent of the earth's surface is water.

And mountains and deserts and ice-covered polar

regions take up their share of the remaining land.

Scientists estimate that only

about 10 percent of the earth is covered

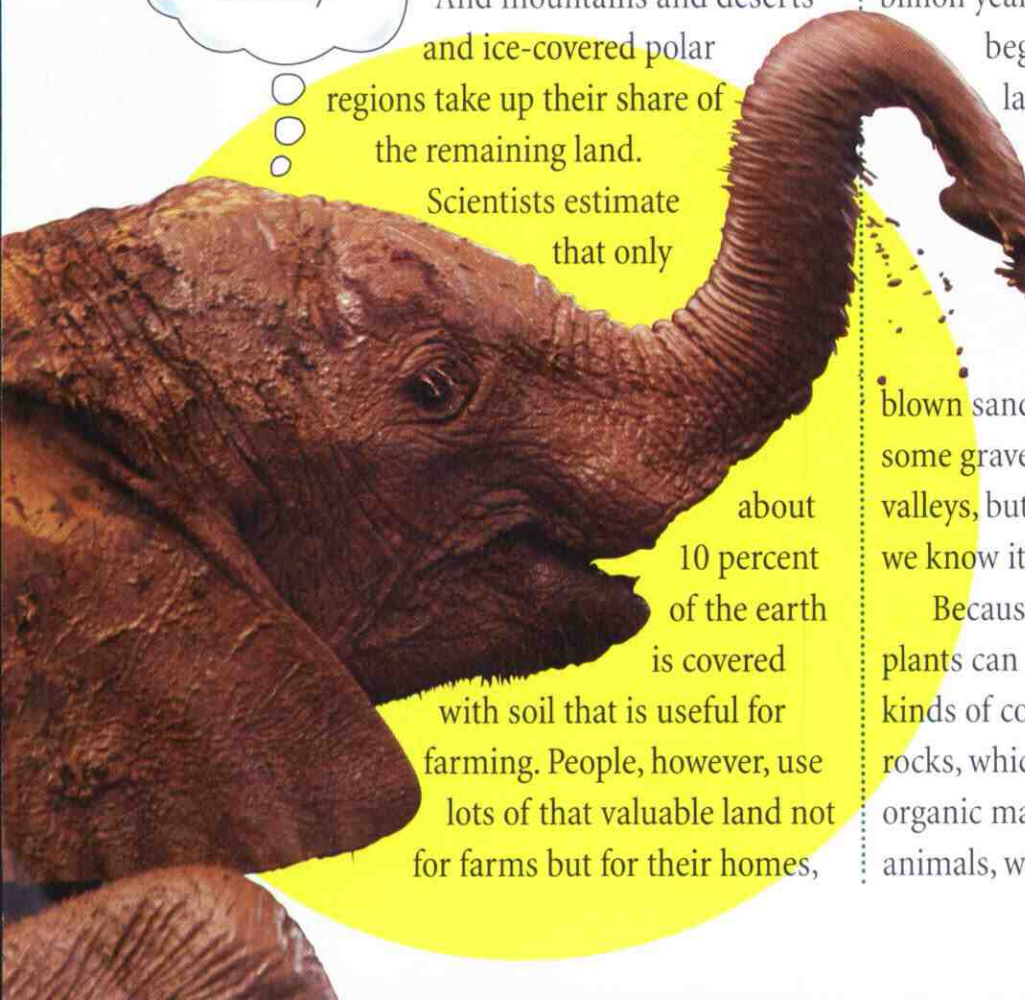
with soil that is useful for farming. People, however, use lots of that valuable land not for farms but for their homes,

A Rocky Start

There hasn't always been dirt on earth. Like plants and animals, dirt had to evolve.

Scientists believe that life on earth first appeared in the oceans about two billion years ago, but living things didn't begin to make their way to dry land for another billion and a half years or more. During all that time, most dry land was very rocky. There may have been wind-blown sand dunes in desert regions and some gravelly rock particles in mountain valleys, but no fine dirt and rich soil as we know it today. Why not?

Because fertile soil—soil in which plants can grow—is made up of two kinds of components: finely crumbled rocks, which are rich in minerals, and organic material from rotting plants and animals, which is rich in energy and





Layer upon Layer

Soil is made up of particles of different sizes. The largest particles, called sand, can be seen with the naked eye and feel loose and gritty. You need a microscope to see silt, the middle-sized soil particle. It feels smooth when wet and

powdery when dry. Particles of clay are so small they can only be seen with a special high-powered microscope. When clay particles are wet, they cling together and form a sticky mass. When dry, they form hard clods.

To see the layers of sand, silt, and clay in soil, put a few inches of dirt in a large jar of water with a tight lid. Shake the jar, then place it where it will not be disturbed for several days. Sand, which is the heaviest, will form a layer at the bottom of the jar, followed by a layer of silt, then clay (although the clay may stay suspended in the water). Any floating bits are the decayed remains of dead plants, called humus.



nutrition. These components had to work together over millions and millions of years to make today's dirt.

Life Depends on Dirt and Dirt Depends on Life

How is dirt made? When rock is exposed to the forces of nature, it breaks down into smaller and smaller pieces in a process called "weathering." During the heat of the day, a rock expands. At night, when the temperature cools, the rock contracts. This cycle stresses the rock and eventually cracks it apart. Or water can get into rock crevices and freeze. As the ice expands, the rock fractures. Wind and rushing water can wear down rocks, too. The growth of plants, which send their roots into the soil,

helps complete this weathering process. Over time, the roots break up the rocks into fine particles of dirt.

When, millions of years ago, primitive plants and animals moved out of the oceans to the land nearby, soil that could support an abundance of life began to form. The first land plants were small and simple. They could survive on the minerals in rocks along with air, sunlight, and rain. When they died and rotted, they left behind organic material, called humus, that would help feed other plants. Over

Shoveling with its back feet, this spadefoot toad buries itself in sandy desert soil to avoid drying out. Now you see him, now you don't.





Now that's an overbite!
Naked mole rats use their sharp buck teeth to dig through hard African soil. Their lips close behind the teeth to keep dirt out.

time, as plants began to spread further inland, they became larger and more complex. Their roots broke up more rocks to help create more soil. Slowly, the world was covered with plants and soil.

Plants need dirt, and dirt needs plants.



Animals also began to inhabit the land, living off the plants. When they died, their bodies added to the organic components of the soil, making it richer and able to support a greater variety of life. Eventually, the land became as full of life as the oceans.

It's a Zoo Down There

People talk about being “dead as dirt,” but actually soil is teeming with life.

With a little patience, you might see some of the bigger and furrier

It's so cozy and squishy...

guys, such as ground squirrels and moles. But there are also less furry things down there. Most insects spend at least part of their lives in the soil. And there are worms. Lots and lots of worms. Under a meadow the size of a football field, there might be more than a million worms wiggling around.

It's really crowded down here.



Sounds yucky, maybe, but you should be glad those worms are there. As they dig their little burrows, they break up the dirt so that it can hold more water and air and grow more plants. And worm poop fertilizes the soil. Worms swallow dirt and digest the bits of leaves and plants in it. Their waste, called castings, is filled with nutrients that plants need.

Worms aren't the only wee beasts feasting underground. When something dies—a leaf, a tree, or an animal—nature's recyclers in the dirt get to work.





Earthworms dig through soft soil by scrunching up in a U-shape and pushing their heads forward, like little battering rams. If the soil's too hard, no problem: a worm opens its mouth wide and eats its way through instead.

It's like a science-fiction thriller where everything is eating everything else.

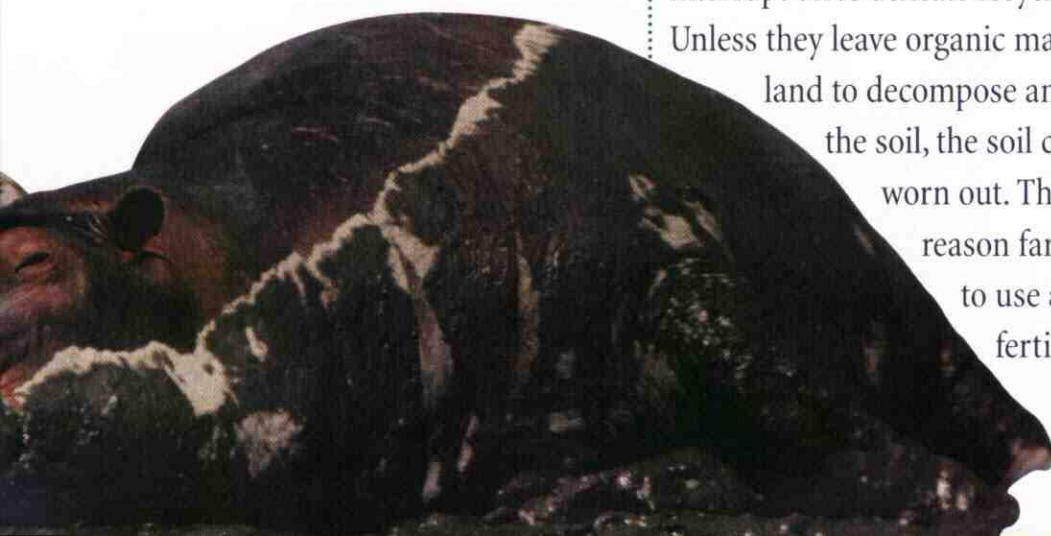
All kinds and shapes of bacteria feed on dead organisms. In turn, microscopic creatures called protozoa feed on the bacteria. The most common tiny animals in the soil are nematodes, or roundworms (although they are not really worms). Some roundworms dine on bacteria, some prey on protozoa, and some eat other roundworms. Fungi, such as mushrooms, grow and feed on rotting things. Some fungi also eat nematodes. And then there are armies of worms, millipedes, and ants

munching away. They all work together to break down and recycle the chemicals and energy stored in dead plants and animals.

Civilized Dirt

With dirt being so important, you might think people would take good care of it. But every year we lose untold tons of valuable soil to erosion and waste. Too often, people treat dirt, well, "like dirt."

People need to understand how dirt works in order to preserve it. When farmers clear the land for crops, they interrupt dirt's delicate recycling process. Unless they leave organic material on the land to decompose and enrich the soil, the soil can become worn out. That's one reason farmers have to use artificial fertilizers.





An unsuspecting pill bug is lunch for a trapdoor spider hiding under the dirt. Gee, how do you think the spider got its name?

- Want to know more about the cool stuff in dirt? Read *A Shovelful of Earth* by Lorus J. Milne and Margery Milne.
- Go on a soil safari to see the creatures in the earth. Visit <http://school.discovery.com/schooladventures/soil/index.html>.

Ancient Egypt was called “the gift of the Nile.” Every summer, as the monsoon winds from the Indian Ocean blew into the highlands of central Africa, a steady torrent of rain

fell. Then rich, brown water flowed down the mountains into the Nile to Egypt, 1,500 miles away. The Nile was muddy with mineral-rich silt and nutritious humus. It flooded Egypt every year, leaving behind a thin skin of new soil only about 1/20th of an inch thick. But this little bit of good dirt meant the difference between life and death and allowed a thriving civilization to grow in Egypt. In modern times, however, dams have been built on the Nile to


prevent flooding, and now artificial fertilizers are needed for the crops to grow.

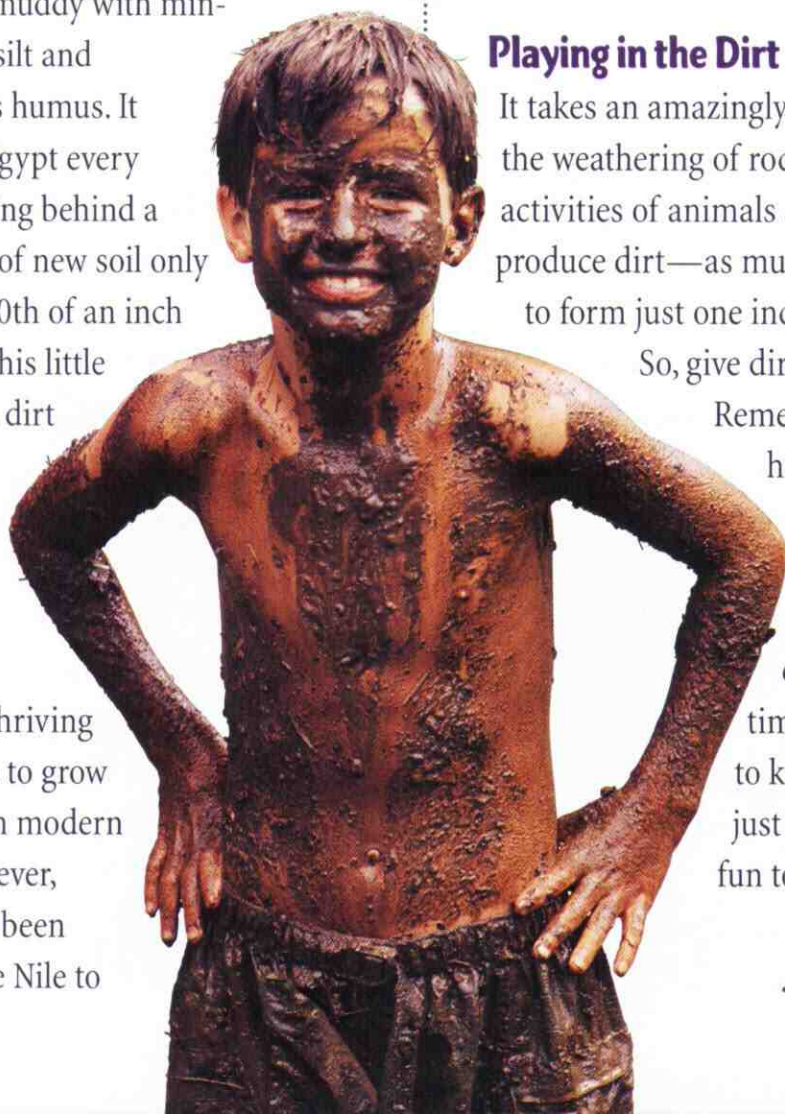
While we might take dirt for granted, some ancient people did understand the power of destroying the soil. When the Romans conquered Carthage, their chief rival, in 146 BC, they razed the city and sold the people into slavery. They also poured salt over the earth. Then they knew the city was dead, because the land could never again be used to grow crops.

Playing in the Dirt

It takes an amazingly long time for the weathering of rocks and the activities of animals and plants to produce dirt—as much as 1,000 years to form just one inch of fertile soil.

So, give dirt some respect.

Remember, the whole history of humanity is wrapped up in the history of dirt. But sometimes the best thing to know about dirt is just that it’s so much fun to play in. 



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